

# **Computer Ethics: Its Necessity and Its Integration into the Curriculum**

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## **Abstract**

Technological advances of this millennium have enabled enhanced learning experiences for students. Technology has and continues to be integrated into the educational environment from many perspectives and to different degrees. However, to facilitate the appropriate use of the power of technology in student learning, we need to integrate the study of computer ethics into the curriculum. This paper addresses the importance of computer ethics and discusses methodology and pedagogy that support student engagement, student-faculty teamwork, student assessment of the quality of the instruction, and the learning of this essential subject.

*Keywords:* student engagement, assessment, instructional technology, academic integrity

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## **Introduction**

Advances in recent technologies in communication and computing affect both pedagogy and learning. The influence of technology on the learning environment in this century cannot be overemphasized. There are courses of study that are completely online, hybrid courses, and blended courses. Even those onsite rely to some degree on technology, be it via research assignments or online tutorials. With the integration of technology into pedagogy come many benefits but concerns as well, as with any significant measure of progress.

One of the major overarching benefits of technology is that it affords the world the opportunity to engage in global learning. Global learning allows for learning 24/7. It is multicultural and intercultural. It supports tolerance and diversity. It engages those involved with varied perspectives on politics, religion, ethnicity, and race. The integration of technology into pedagogy is sometime referred to as virtual learning. This can include using Google to search for an answer, reading an e-text, or taking a course online.

The rapid growth of technology has left a clear impact on the educational environment. Online distance education is growing in popularity. Instructional technology is being incorporated into courses in the traditional classroom and the concept of hybrid courses that have both an on-site and online component is being implemented on a wide-scale basis. The increased use of computers across the curriculum compels our students to be knowledgeable about computer ethics and the related social and legal issues so that the rewards of technology become accessible to all (Bynum and Rogerson 1996; Huff and Martin 1995; Kallman and Grillo 1993; Maner 1996). It is our pedagogical obligation to help learners develop the necessary habits of scholarship that are required for use of the

computer, the Internet, and electronic resources in an intellectually responsible way (Martin et al. 1996; Martin 1999; NSF 1998).

Students in all majors are utilizing computers within the classroom as research tools and to communicate with friends and colleagues. For some, computers actually serve as the sole vehicle of participation in classroom discussions. In order to facilitate the appropriate use of the power of technology in student learning we need to integrate the study of computer ethics into the different disciplines (Ben-Jacob 2003).

Along with the advances in technology that facilitate teaching and learning come the associated issues that educators must address and raise the awareness of students as well. These include the fact that user-created content is subject to mistakes, bias, and inconsistencies. Since anyone can publish on the Internet, one must be careful of the validity of the source. Internet resources are temporal. Plagiarism is more rampant and electronic sources must be documented. The form for documentation is different from those of hard copy sources, journals and books. Blog comments can be volatile and Wikis can be modified inappropriately.

Our goal is multifold: We want to integrate the ethics of technology into the undergraduate curriculum early on, since technology is integral to the undergraduate education and our students need to use technology in a responsible manner. We want to include our students in the educational process and support student-faculty projects that will do just this. Who knows better than students as to what the educational issues are for them?

Some of the many topics that arise are the following:

- Plagiarism,
- Falsification of data
- Fabrication of data
- Honor codes
- Professional codes
- Cultural effects

- Moral attitudes and personal integrity
- Collaborative science
- Research misconduct
- Conflict of interest and commitment
- Responsibility to society
- Human subjects
- Animal subjects

To develop a baseline of student knowledge and to insure that students understand the different topics of computer ethics, we envision a scenario-based survey. These surveys will assess student understanding. Based on our past experience, students often do not always realize they are acting unethically. An instance that comes to mind is when a student had copied directly from a source without citing the source and even without quotation marks. When I explained that it is inappropriate to do this in a paper without documentation, he responded he was taught that it was an honor to use someone else's words and no documentation was needed! Other students from different backgrounds have no idea that if you exaggerate or adjust data, it is considered falsifying data and you are acting unethically. The claims were that they just wanted to substantiate their opinion and most of the data was as per the course. The analysis of these instruments will help to classify actions associated with computer ethics at the undergraduate level.

Another survey we plan to administer will have the students evaluate the importance of each of the aforementioned topics based on their field of specialization. This will be evaluated on a Likert scale. The faculty will complete an analogous survey which will be compared and contrasted to that of the students' responses.

The third student survey will assess student attitude toward the teaching of computer ethics and the effectiveness of various pedagogical methods of integrating the content into the curriculum. Some of the pedagogical strategies include overall discussion of all types of computer ethics, independent student projects, and the use of clickers and the development of modules to name just a few. The modules can be done as an independent student project, as team project or as a student-faculty project.

An example of the module to which we are referring includes the following categories to complete:

- Our design of classroom exercises, i.e. the module template
- Topic area
- Target audience, the relevance to the course in which it is being used
- Materials
- Background information
- References
- Activity e.g. reading assignment, worksheet classroom exercise, debate (Ben-Jacob 2004; Bowyer, 2000).

The following is a specific example of a module on the issue of plagiarism, a concern that crosses all disciplines. It appears in *Integrating Computer Ethics Across the Curriculum*.

### **Academic Integrity: Ethical Behavior for Students**

**Abstract:** Cheating is present in too many institutions of learning. If students are aware (that the professor is aware) of the different methods of cheating, it may lower the incidences of non-ethical academic behavior. In addition, evaluation of information from the web will reinforce critical thinking and the exercises will strengthen the art of collaboration among students.

**Goals for the activity:** To raise student awareness of what is considered to be ethical academic behavior for students and what the possible consequences are for what might otherwise be construed a seemingly, harmless action.

#### **Knowledge / skills / attitudes to be developed (behavioral objectives):**

- To have students understand what plagiarism is and why it is wrong.
- To have students critically analyze case studies and other information on ethics that are available on the Internet.
- To have students explore their opinions on ethics and compare and contrast them with the views of others.
- To have students work collaboratively.
- To make students aware of the consequences of lack of academic integrity and generically, lower the incidence of cheating.

**Procedure:** Start with definitions of ethical academic behavior, cheating, plagiarism, and whistle blowing. Have the students complete the reading assignment of cases and worksheet. Divide the class into groups that must collaborate and form a consensus.

**Assessing outcomes:** Qualitative outcome—Part I of the Worksheet: Ask the students if their initial attitudes are different from their attitudes after the assignment and if their opinions differ from the groups and why. Quantitative outcome —Part II of the Worksheet: The number of correct answers.

**Additional remarks:** Assignment

Read the case studies and the article on the legal aspects of academic dishonesty. Take a look at some of the websites mentioned in the reference section. Complete the worksheet.

## **Worksheet**

### **Part I**

1. List the different ways a student can cheat in a college course.
2. Prioritize this list in the order of “most to least heinous.”
3. Which of these ways is suitable only to on-site learning? Online learning?
4. If one of your peers were cheating, would you report him/her?
5. Does your answer to question 4 change if the other student was/was not in your class?
6. What type of punishment do you think is suitable for someone who caught cheating?
7. Would you support the enforcement of the aforementioned punishment if the student claimed ignorance, e.g. “I did not know that was considered plagiarism.”

8. Name areas, other than the academic environment where cheating and plagiarism can take place.
9. Comment on the case studies that you read, e.g. Was there proof of cheating? Was the punishment in line with the crime? Was the outcome of the case in agreement with your sense of ethics?

## Part II

Consider the following original paragraph taken from Dr. Kevin Bowyer's book *Ethics and Computing, Living Responsibly in a Computerized World* (IEEE Press), and the three paragraphs that follow it. Determine why each of the three is plagiarized.

Original:

Reading can help you learn about things like codes of ethics and resolutions of particular ethical conflicts, but ethical behavior is a way of life. As such, it is best learned through experience; that is, by continually living ethically yourself.

Paragraph1:

According to Bowyer reading can help a person behave in an ethical manner but ethical behavior is a way of life. The best way.....



Paragraph 2:

Reading can help you learn about things like codes of ethics and resolutions of particular ethical conflicts, but ethical behavior is a way of life. As such, it is best learned through experience; that is, by continually living ethically yourself.

Paragraph 3: One can read about ethical behavior in different situations but the best way to understand ethics and what is considered to be ethical behavior is to integrate it into one's own life. This can be accomplished..... (Ben-Jacob 2004).

The overall data analysis of the measurement instruments will reflect information about: (1) student knowledge (2) student opinion with regard to the pedagogical tools developed in our the learner-centered environment (3) faculty reaction toward the pedagogical tools developed, (4) information with regard to the support and implementation of computer ethics and how to make students aware of its importance (5) a comparison between student and faculty attitudes toward different topics of computer ethics. We will review and refine our pedagogical materials to reflect the feedback. Our goal is to enhance student learning by incorporating the study of computer ethics via

- Fostering student engagement
- Developing faculty-student projects as a key to innovation
- Engage student as assessor of learning and evaluators of quality.

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